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**EARTH SCIENCES DIVISION**

**Integrated Safety Management Plan**

**Revision 6**

**February, 2005**

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## Change History

This Health and Safety Plan is reviewed and modified as necessary as part of the Division's Annual Self-Assessment to assure continual improvement. The following table outlines the change history to this Plan:

Revision	Change Date	Summary of Changes
REV 6	February, 2005	Updated department names, opportunities for improvement; clarification of line management supervisor/PI EH&S responsibilities; ergonomic injury prevention policy; SAA policy; MOU w/ UCB; Lab-space Lead PI description; lab safety primer description.
REV 5	14 July, 2003	Minor update. Expanded explanation of work authorizations and process and expectation for students. Plan modified to include updated opportunities for improvement and appendices.
REV 4	February 2002	Significant revision. Improved accident investigation process, developed ergonomics initiative, changed process to better involve line management and changed procedure for matrixed employees. Updated opportunities for improvement and appendices.
REV 3	June 2001	Minor updates including updated opportunities for improvement and appendices.
REV 2	June 1999	Minor updates including updated opportunities for improvement and appendices.
REV 1	May 1997	Initial document developed under Integrated Safety Management System

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## 1. INTRODUCTION

The Earth Sciences Division (ESD) at Berkeley Laboratory performs fundamental and applied geosciences research related to subsurface energy resources, nuclear waste disposal, environmental restoration and ecology, and climate change. ESD maintains experimental (laboratory and field) and computational core-capabilities in the disciplines of vadose and saturated zone hydrology, fracture hydrology, atmospheric and ocean sciences, petroleum and geothermal reservoir engineering, seismic and electromagnetic geophysics, isotope geochemistry, and rock and soil physics.

Each ESD staff member belongs to a Resource Department (Geophysics, Hydrogeology, Geochemistry, and Ecology) aligned with their professional expertise, which also serves as their administrative home. Department Heads are responsible for safety, staffing, promotions, and training matters. Departments are further divided into Research Areas, each with a scientific focus, led by a Research-Area Leader. Departments provide the people and the facilities to do the research, but do not control research funds.

Research in ESD is conducted within five large Programs (Nuclear Waste, Energy Resources, Fundamental and Exploratory Research, Environmental Remediation, and Climate Change and Carbon Management) that are aligned to our major DOE funding sources. Each Program is lead by a Program Head who is the principal point-of-contact between ESD research and DOE, and has a major responsibility for sustaining and building programs. Research-Area Leaders (described above) and Program Coordinators (if appointed by a Program Head) may also share in program responsibility. Every member of the ESD scientific/technical staff is assigned to work on one or more projects in these five Programs. Projects are led by one or more Principal Investigators (PIs), who typically develop the research proposal and obtain the funding contract. Employees typically work on more than one project during a fiscal year, and as a consequence often work under the direction of more than one PI. In addition, an employee can be a participant on one project and the PI for another project. Regardless of how many projects an employee works on or leads, that employee has only one administrative Supervisor.

The ESD Organization Chart is shown in Appendix 1. Line Management with respect to an employee's safety is defined as the administrative Supervisor to Resource Department Head to Deputy Director to Division Director to Lab Director. Line management with respect to implementing EH&S policy flows from the Lab Director, to the Division Director, to Department Heads, to Principal Investigators. All ESD management must ensure that work under their leadership is performed in compliance with ESD's and LBNL's Environmental Health and Safety Plan.

ESD is committed to performing work safely and in a manner that ensures protection of employees, the public, Laboratory assets and the environment. ESD's line and Program management, its staff, contractors, students, and guests are responsible and accountable for the safe

performance of work, and will exert sufficient care, and provide resources toward the safe conduct of its operations.

## 2. INTEGRATED SAFETY MANAGEMENT SYSTEM (ISMS) IMPLEMENTATION WITHIN ESD

The Berkeley Laboratory's EH&S policies and requirements are contained in the Regulations & Procedures Manual (RPM) <http://www.lbl.gov/Workplace/RPM/>, the Health & Safety Manual (PUB-3000) <http://www.lbl.gov/ehs/pub3000/>, the Integrated Environment, Health & Safety Management Plan (PUB 3140) <http://www.lbl.gov/ehs/ism/Title.html> and the Self-Assessment Program Implementation Plan (PUB-5344). These policies and procedures implement the contractual requirements between the Department of Energy and UC Berkeley contained in Contract 98 <http://labs.ucop.edu/internet/comix/>, Appendices F (Performance Measures) and G (Directives).

This Integrated Safety Management Plan (ISM) (referred to as the Plan) explains how the Berkeley Laboratory's EH&S policies and procedures will be implemented in ESD and defines the roles and responsibilities for ESD employees, students, visitors, participating guests and contractors. The Plan will be reviewed, and modified if necessary, as part of the Division's Annual Self-Assessment to assure continuous improvement.

This ISM Plan covers all LBNL workers, including employees, employees matrixed to ESD from other divisions, students, guests, and visiting scholars, regardless of compensation and regardless of work location. LBNL work performed at the UC Berkeley campus must conform to the *"Partnership Agreement Between UCB and LBNL Concerning Environment, Health and Safety Policy and Procedures"* ([http://www.lbl.gov/ehs/ism/ucb\\_lbl\\_partnership\\_3\\_15\\_04.pdf](http://www.lbl.gov/ehs/ism/ucb_lbl_partnership_3_15_04.pdf)) dated March 15, 2004.

The following sections of this Plan describe how ESD applies the Seven Guiding Principles to Achieve ISM (described in PUB-3000, Section 1.3) by means of the Five EH&S Core Functions (PUB-3000, Section 1.4).

### 2.1 Opportunities for Improvement:

Through the self-assessment process, ESD continually obtains feedback and identifies opportunities for improvement of its EH&S program. Opportunities to be addressed in the coming year include the following items identified in the MESH 2004 review (items 1 and 4) and ESD's self-assessment activities (items 2, 3 and 5).

- 1. Off-site work reviews and authorizations-** ESD currently has numerous off-site projects. Each project has an Off-Site Safety and Environmental Protection Plan (OSSEPP) on file. However, the currently required information and blanket safety training requirements of first-aid, CPR and Fire Extinguisher do not apply to all types of off-site projects, and are overly burdensome in some cases. The 7+ page form contains many items frequently marked "not applicable." With the change in travel procedures (self-booking)

there is currently no mechanism to ensure that an OSSEPP is completed before travel commences. Also, there is no requirement to review the OSSEPP annually if a change in scope has not occurred. Action to Rectify: The ESD Safety committee will review and revise the form to accommodate different types of projects and their different training requirements, and shorten the form. The Earth Sciences Division Safety Coordinator (DSC) will work with the ESD Business Manager to develop a procedure to couple OSSEPP completion and travel authorization, and annual update.

2. **ESD Safety Committee** - ESD's safety committee has historically met quarterly, and served as a sounding-board for the division's EH&S activities. A more proactive safety committee is needed to address the increasing complexity and demand of EH&S activities and improve ESD's safety culture. Actions to Rectify: The safety committee was reconstituted in the Fall of 2004 with representatives from each ESD department, and now facilitates communication between ESD staff and the committee, e.g. by sending out minutes, updating the website information, walkthroughs, and engaging ESD staff in EH&S issues. The frequency of committee meetings was increased from quarterly to monthly.
3. **Compliance of Hazardous Waste Satellite Accumulation Areas (SAAs)** – An SAA in an ESD lab was found to have waste that exceeded the required time limit, which resulted in a Nonconformance and Corrective Action Report. Actions to Rectify: A new ESD policy will require waste in ESD SAAs to be picked up within six months of being placed in the SAA. Quarterly SAA inspections by the DSC and the EH&S Hazardous Waste Generator Specialist will verify compliance. ESD hazardous waste generators will be required to notify the DSC when they start and decommission an SAA. Informal ESD monitoring of SAAs will be increased.
4. **Improve Safety Review Questionnaire.** The present questionnaire does not include all possible authorizations. Some projects have found themselves unable to cover the costs of required EH&S activities, and clean-up of legacy or decommissioned work. There is currently no mechanism to periodically review the questionnaire. Actions to Rectify: The “work authorizations” section of the form will be updated to list general license, laser, biosafety and x-ray. The procedures for submitting the Project Safety Review Questionnaire, completed by PIs during the proposal preparation phase, will be reviewed and the form will be revised to improve PI awareness of addressing safety activity issues during the planning and budgeting stages of research activities. Furthermore, procedures will be evaluated to ensure that PIs also consider EH&S issues when decommissioning research projects, relocating their operations or closing out a lab, and that the questionnaire is periodically reviewed and updated.
5. **EH&S Training for Supervisors** – In light of promoting our proactive safety culture, the ESD Division Director is working with EH&S to pilot a modification of EH&S 0020 with ESD staff that will be relevant to scientific supervisors.

## 2.2 Responsibility and Accountability

All employees in ESD, regardless of job classification, work location, seniority, or supervisory responsibilities, are to work under this ISM Plan and are responsible for working safely. Furthermore, Line Management (the Division Director, Department Heads and Supervisors) and Program Heads, Principal Investigators, Research-Area Leaders and those serving in management roles or having management titles, have a special and unique responsibility for this by providing safety leadership. This section discusses the safety responsibilities of all ESD personnel, personnel matrixed to ESD from other divisions, students, visitors and participating guests.

The **Division Director** is responsible and accountable to the Laboratory Director for assuring that demonstrable policies and programs are established and implemented to support and comply with the Laboratory's EH&S policies and requirements. The Division Director shall lead discussions on relevant safety issues at Division Council meetings and Division wide town hall meetings. Safety shall be an agenda item at these meetings. The Division Director shall also maintain visibility and demonstrate line management commitment to EH&S by periodically walking through Division work space. The Division Director shall review and approve this Plan on an annual basis, and shall hold all ESD staff accountable for understanding and complying with its provisions.

The ESD Division Director has implemented a policy for employees who are injured on the job, in order to ensure that ESD management actively participates in investigating accidents and is held accountable for corrective actions to prevent recurrence. Any person sustaining an OSHA Recordable accident, and their Supervisor, shall meet with the Division Director to discuss the details and cause of the injury. In such cases, the injured person shall write a lessons-learned report that will be submitted to the Division Safety Coordinator. Section 2.6 "Worker Safety" of this Plan provides further information regarding line-management response to accidents.

The **Division Safety Coordinator** (DSC), appointed by the Division Director, is responsible and accountable to the Division Director for establishing, documenting, disseminating, and tracking compliance with Division EH&S policies. The DSC serves as a point of contact between ESD staff (including matrixed employees, students and guests) and LBNL's EH&S division. The DSC shall promote the communication of EH&S issues throughout the division, shall update ESD's EH&S website on an ongoing basis. The DSC shall provide quarterly Division EH&S Program Status Reports to the Division Director and provide upon request additional reports to persons and offices of outside organizations with and for whom ESD conducts research. S/He shall also conduct additional safety surveillances at the request of the ESD Director. The DSC shall provide an annual Self-Assessment Report to the EH&S Division Office of Assessment and Assurance, through the ESD Director. The DSC shall review and revise this Plan annually.

The Division will maintain a **Division Safety Committee**, consisting of the DSC, at least one representative from each Department, and the EH&S Division Liaison to the Earth Sci-



ences Division. The Division Director will participate on an *ex officio* basis. The Safety Committee will monitor the implementation of the Division's EH&S program, identify opportunities for improvement, advise the Division Director on EH&S issues, and facilitate communication of EH&S issues throughout the division.

The Safety Committee will be chaired by an ESD staff member, appointed by the Division director, who will organize monthly meetings, set agendas and will record and publish meeting minutes which will be distributed to the Division Director, Department Heads, Program Heads, Committee Members, and posted on ESD's EH&S website. The committee will identify important issues at each meeting for distribution as ESD-level 1 emails. Each meeting will begin with a resolution-oriented discussion of the most critical current divisional safety issues.

**Department Heads** are responsible and accountable to the Division Director for understanding Berkeley Laboratory's and ESD's EH&S policies. They are further responsible for understanding and complying with the provisions of this Plan. Department Heads shall lead discussions on relevant safety issues at their respective meetings. Safety shall be an agenda item at these meetings.

Department Heads, as part of Line Management for employee safety, are further responsible for assuring that this Plan is understood and is being implemented by their line managers (Principal Investigators, and other supervisors). Department Heads will lead at least two inspections per year of ESD on-site spaces where people in their Department work, described in Section 2.6 "Worker Safety" of this Plan.

Department Heads designate one Lab-space Lead PI for each laboratory space in their department. The Lab-space Lead PI is ultimately responsible for resolution of all safety issues within the laboratory space; this role is described in Section 2.3 "EH&S Roles Responsibilities within ESD" of this Plan.

**Principal Investigators and other Supervisors** are accountable to their Department Head for understanding and complying with the provisions of this Plan and for assuring that on-site and off-site research activities are reviewed annually to identify and control work hazards, that appropriate safety documents and authorizations are prepared and/or reviewed, that all work is carried out in a safe manner and in accordance with all Laboratory and Divisional EH&S requirements as set forth in this Plan.

Supervisors are responsible for ensuring that the employees assigned to them (including guests, students and matrixed employees) have completed the Laboratory's Job Hazards Questionnaire (JHQ), have taken all required EH&S training courses, are properly trained, as described in Section 2.5 "Qualifications and Training" of this Plan. Supervisors shall understand the job hazards their employees encounter in the course of the employee's work for other Principal Investigators, and ensure that their employees receive the appropriate training. Supervisors ac-

count for their employees' performance on EH&S issues when determining the employee's overall job performance at the six-month and annual reviews.

Principal Investigators and other supervisors shall also lead discussions on relevant safety issues at their respective meetings. Safety shall be an agenda item at these meetings.

Safety responsibilities for Principal Investigators and other supervisors are further explained in Section 2.3 "EH&S Roles Responsibilities within ESD" of this Plan.

**Employees, students, participating guests, and contractors** are responsible for understanding and complying with the provisions of this Plan and for knowing and following the EH&S requirements that apply to their work. They are expected to understand, and be trained to deal with, the hazards associated with their work, to work safely, to report all unsafe conditions and accidents to their supervisors and to comply with the Division's EH&S requirements. ESD employees, students, participating guests, and contractors as well as those matrixed to ESD from other Divisions, are expected to comply with training requirements described in Section 2.5 "Qualifications and Training" of this Plan.

All Berkeley Lab employees, contractors, students, and participating guests are responsible for stopping work activities considered to pose imminent danger to life or limb. If there are concerns about the safety, health effects, and/or environmental impact of an activity, persons performing the work may stop the work and ask their Supervisor, the PI, the Division Safety Coordinator, or the EH&S Division Liaison or other member of the EH&S Division staff for assistance to resolve the issue before proceeding. The employee's Supervisor should be regarded as the *primary* point of contact for all safety concerns. The safety reporting structure is further defined in the following section "EH&S Roles and Responsibilities within ESD".

### 2.3 EH&S Roles and Responsibilities within ESD

Each employee has one administrative Supervisor who looks after the employee's professional development, mentoring, safety and training. The Supervisor answers, or helps to answer, the employee's EH&S questions, and is responsible for ensuring that the employee (1) is aware of work hazards and controls, (2) receives appropriate training, (3) works safely and within controls. The Supervisor is part of the investigative process arising from an employee accident.

Within ESD, employees commonly work within a Project under the direction of a PI who is not the employee's supervisor. In these cases, the PI and the supervisor have complementary responsibility for the employee's safety training and safe work practice, as follows. It is responsibility of the PI to see that all staff working on the PI's project have the appropriate on-the-job training and knowledge to perform the work safely. The PI shall advise the employee regarding hazards to enable effective completion of the JHQ. The supervisor shall verify that the employee has received appropriate job-specific training by the PI, as well as the training require-

ments generated by the JHQ process, as described in Section 2.5 “Qualifications and Training” of this Plan.

In the case of employees matrixed from another division to ESD, the host and home supervisors have complementary responsibility for the employee’s safety training and safe work practice, as follows. It is the responsibility of the host supervisor to see that matrixed employees have the appropriate training and knowledge to perform their work safely. The home supervisor shall verify that the employee has received appropriate job-specific training from the host division, as well as the training requirements generated by the JHQ process, as described in Section 2.5 “Qualifications and Training” of this Plan.

When an employee conducts part of his/her work away from his/her normal work environment, the appropriate on-site lab/facility manager, Principal Investigator or the off-site safety manager designated in the particular ESD Off-Site Safety and Environmental Protection Plan (described in Section 2.4.c. “Off-site work” of this Plan) assumes EH&S responsibility for that employee in addition to the employee’s Supervisor. Work locations away from the normal work environment include: (1) an off-site field location, (2) one of the ESD Centers or Labs listed in the following section, or (3) an on-site facility belonging to another Division.

**Lab-space Lead PI -** For each ESD laboratory room, a single PI is designated by the Department Head as the Laboratory-Space Lead (see the listing of Responsible Lab PIs in Appendix 5). This includes laboratory spaces shared by several projects in one Program, or by more than one Program. While all PIs are responsible for ensuring that their projects are conducted in a safe manner, the Lab-space Lead is empowered to resolve safety issues for the space and also coordinates shared EH&S laboratory functions. Examples include housekeeping, chemical inventory, waste management, and updating EH&S databases for all projects using that lab space. The Lab-space Lead PI is ultimately responsible for resolution of all safety issues within the laboratory space, and maintaining a Lab Safety Primer that contains documentation of the hazards of that particular laboratory (see Section 2.6 “Worker Safety” of this Plan). However, when a single PI other than the Lab-space Lead is the sole user of a piece of apparatus, that PI is responsible for ensuring that hazards associated with it are controlled and documented, in cooperation with the Lab-space Lead PI. Additionally one person (generally a research associate or technician) who typically works in the laboratory full time is designated as the point of contact for that space.

## 2.4 Scope of Work Authorized

### a. General

ESD employees develop tools and knowledge that enhance understanding of the Earth. They perform three types of research work: (1) theoretical and computational studies in offices, (2) analytical measurements, instrument development, and bench-top physical modeling in wet labs and instrument shops, and (3) experiment installation and geoscience data acquisition at various off-site (also called *field*) locations.

Each Resource Department within ESD performs bench-top research and tool development in laboratories located in buildings 14, 70, 70A, 51 and 51F. Offices are also located in these buildings, with the majority of office space located in Building 90. Most field-work is staged in building 64, which includes a machine shop, and some smaller field projects are staged in buildings 70 and 70A. Links to descriptions of ESD facilities can be found at <http://www-esd.lbl.gov>.

Off-site work, comprising approximately 2.5 to 5 percent of the total annual ESD labor effort, is conducted at various sites owned and managed by federal, state, and private organizations. Some research is performed on ocean vessels.

### b. Work Requiring Safety Review and Approval

Line Managers, in conjunction with PIs, shall ensure that all work is conducted within authorizations and that the authorization documentation is reviewed at least annually and updated as personnel assignments, work-scope and experimental procedures change. To determine the level of safety documentation, worker training, hazards and hazards control for each project, Principal Investigators will review [LBNL PUB-3000 Chapter 6, Safe Work Authorizations](#) and complete a Project/Facility Safety Review Questionnaire (SRQ) (Appendix 3) at the time of Field Work Proposal (FWP) or proposal submission, renewal, and whenever a change in work-scope occurs. Each SRQ is reviewed by the DSC, who may consult with EH&S Division professionals for advice on whether the project requires additional safety documentation and EH&S approval such as a: Radioactive Work Authorization (RWA), Sealed Source Authorization (SSA), Activity Hazards Document (AHD) or an Off-Site Safety and Environmental Protection Plan (OSSEPP) (specific to ESD and described in the next sub-section).

The work presently being carried out in ESD that requires additional EH&S documentation and approvals (beyond the SRQ) is listed in Appendix 4.

### c. Off-site Work

An OSSEPP is required for all off-site research activities. An approved OSSEPP, read and signed by each ESD staff member participating in the field work, is required before travel to off-site work other than an observer's visit. The OSSEPP is intended to document site-specific and work-specific hazards, to inform workers of the hazards present, to identify the training and protective measures needed to perform work safely, to provide emergency information and to serve as a safety training document. The Principal Investigator of each off-site project is responsible for preparing an OSSEPP in accordance with ESD procedures and the health and safety rules, procedures, training requirements and other guidelines established at each off-site facility. The OSSEPP is approved by the PI and DSC; EH&S subject matter experts will be consulted as needed. The PI shall ensure that all staff assigned to an off-site research project have read and signed the approved OSSEPP before travel. OSSEPPs shall be kept on file in the ESD Division Office and will also be posted or readily available at the work site. OSSEPPs will be reviewed annually and updated when the scope of work, staffing or hazards change.

### d. Work on the UC Berkeley Campus

Work carried out by ESD employees on the UC Berkeley Campus in spaces under the control of UC Berkeley will be carried out in accordance with the *"Partnership Agreement Between UCB and LBNL Concerning Environment, Health and Safety Policy and Procedures"* ([http://www.lbl.gov/ehs/ism/ucb\\_lbl\\_partnership\\_3\\_15\\_04.pdf](http://www.lbl.gov/ehs/ism/ucb_lbl_partnership_3_15_04.pdf)) dated March 15, 2004 as provided in the LBNL Institutional ISM Plan:

- LBNL PIs have an obligation to Berkeley Lab management to provide a safe workplace on campus for all Berkeley Lab-sponsored work. At UCB, this is satisfied by complying with the UCB Safety System.
- LBNL PIs are responsible for analyzing work of persons under their direction and for assuring that the proper training for safe conduct of work is identified and obtained. Until an individual has been properly trained, s/he will work under the direct supervision of someone who is already trained. The type and method of training for work performed at UCB is specified by UC Berkeley.
- LBNL PIs conducting Berkeley Lab-sponsored work are free to implement controls and other measures beyond the institutional requirements if they deem it appropriate.
- LBNL PIs working at UCB can request a joint safety assessment (to be conducted by representatives of both the UCB and LBNL EH&S organizations) to further aid them in ensuring a safe workplace.

LBNL PIs conducting Berkeley Lab-sponsored work at UCB will provide an assurance that they have met UCB standards including properly specifying training requirements (for themselves, workers and students), obtaining and adhering to UCB work authorizations, and meeting UCB self-inspection requirements.

## 2.5 Qualifications and Training

*Guiding Principle: All ESD employees, students, contractors, and guests shall have the necessary technical skills, knowledge, training, personal protection equipment, and certifications required by law and by Laboratory policy to perform their duties safely and in a manner protective of the Laboratory's assets and the environment.*

Everyone working for more than 30 days in a calendar year at the Berkeley Laboratory, including guests, will complete a Job Hazards Questionnaire (JHQ), accessible online from the Lab's and ESD's EH&S websites. It is advisable for a new employee to complete this with the Supervisor, to make sure the employee understands his/her job duties. The employee's Supervisor is responsible for ensuring that the JHQ is completed and that the employee's training status is reviewed as part of the annual performance review process (P2R or PRD). Each employee's safety performance will be measured against the requirements of this Plan during his/her P2R or PRD, and is considered in the overall performance rating.

The output of the JHQ process is a list of required and recommended safety training. Each employee's supervisor will ensure the required LBNL training courses are taken within 90-days of the JHQ. Depending on the job requirements, the supervisor may specify additional training, such as off-site courses and on-the-job training. Employees are responsible for completing required training in a timely manner (within 90 days of completing the JHQ or as soon as possible for courses offered less frequently), and for updating the JHQ annually or more frequently when a change in job duties occurs and completing additional training in a timely manner. A change in job duties includes temporary assignments to other ESD Programs outside of their home Departments and Programs. Employees that have not completed required training must work under the direct supervision of a trained individual.

The Principal Investigator is responsible for task-specific training for employees working on the PI's project that is not covered in JHQ-generated training requirements. The supervisor should ensure that the employee is aware of this, and verify that the employee has received the required specialized training. This shall be documented in "Lab Safety Primers," which are described in Section 2.6 "Worker Safety."

Employees who are assigned to off-site project work may be exposed to additional site-specific, natural and man-made hazards. The Principal Investigator of the field project shall ensure that these employees are informed of any new hazards as well as any additional controls and training required for protection and safety. This shall be documented in the OSSEPP developed for that project, described in Section 2.4 "c. Off-site work" of this Plan. The project Principal Investigator shall also ensure employees take additional training required by the host site as documented in the OSSEPP.

For guests working at the Berkeley Laboratory for 30 days or less and engaged in field or laboratory research, the type of safety training will be determined by the host supervisor and/or PI. Until they have received proper training, guests must work under the direct supervision of their supervisor and/or PI.

## 2.6 Worker Safety

*Guiding Principle: Supervisors will provide employees with a safe workplace and will ensure that work is performed within the authorized controls.*

**Line managers** shall ensure that workplace hazards are identified, evaluated, and controlled and that employees are provided with and use the appropriate safety controls including personnel protective equipment and proper ergonomic furnishings. Line managers shall also hold each employee accountable for safety, and shall recognize EH&S contributions via the performance review process.

Department Heads shall conduct safety walk-throughs of laboratory and office areas under their jurisdiction to identify and correct EH&S deficiencies. The walkthroughs serve the purpose of proactive accident prevention and promotion of EH&S awareness among staff members and demonstrate the importance that line management attaches to safety. Walkthroughs will be conducted at least twice a year, as noted in Section 2.2 “Responsibility and Accountability”. The inspection items are listed the Earth Sciences Division Safety Checklist (Appendix 2), and documentation of findings will be distributed to ESD line management and responsible parties; findings not corrected on the spot will be entered into LCATs. Corrective actions for noted deficiencies will be assigned to the Principal Investigator responsible for the area. Follow-up inspections will be conducted by the cognizant Department Head within 60 days in those areas where deficiencies or corrective actions were identified, unless safety considerations require that these be corrected sooner. This is to ensure that corrective actions have been implemented. In addition to the semiannual inspections, any safety deficiencies noted at any time by the ESD management or DSC shall be entered into LCATs and corrected within 60 days, or sooner if they present an immediate threat to safety.

Each ESD Lab-space Lead PI (defined in Section 2.3 “EH&S Roles and Responsibilities within ESD”) will maintain a “Lab Safety Primer” that provides ready access to information needed to work safely. This manual will include copies of all relevant work authorizations and Safety Review Questionnaires for the work performed in the space. A separate manual for each laboratory, or group of laboratories, can be prepared at the discretion of the Lab-space Lead PI. Each person working in a laboratory should know the location of the safety manual and read it. The manual will be updated annually or whenever the scope of work changes.

OSHA-recordable accidents that occur within the Division shall be thoroughly investigated to identify root cause and prevent recurrence. The supervisor, injured employee, ESD Safety Coordinator and the EH&S Division Liaison will meet together and investigate each in-

jury/illness at the site of its occurrence. Furthermore, supervisors are required to discuss accident investigation findings and corrective actions for all DOE Recordable Accidents with the Division Safety Committee. In addition, the Division Director will meet with all injured employees, as discussed in Section 2.2 “Responsibility and Accountability” of this Plan.

Repetitive motion injuries account for a significant fraction of the injuries and illnesses in ESD. To promote ergonomic awareness and prevent injuries from occurring, employees should take the appropriate EH&S training, and have an EH&S specialist evaluate their workstation. Ergonomic evaluations should also be performed when an employee moves to a new location and/or experiences the earliest signs of discomfort. The employee then works with their supervisor and/or PI to implement the evaluator’s recommendations, including the purchase of recommended equipment, furnishings, or their modifications.

## 2.7 Environmental Protection and Waste Management

*Guiding Principle: ESD will conduct activities in a manner that protects the environment while complying with applicable air quality, water quality, and hazardous waste requirements, including appropriate efforts to prevent pollution and to minimize wastes produced.*

All hazardous waste generated shall be appropriately and accurately labeled, contained, and disposed of in accordance with LBNL and California State regulations. All waste that is ignitable, toxic, corrosive and/or reactive is deemed chemically hazardous and shall be kept in a Satellite Accumulation Area (SAA). Waste that is radioactive or a mixture of chemically hazardous and radioactive waste shall be kept in a Mixed Waste Accumulation Area (MWAA). The DSC will keep a list of all SAAs and MWAA in the division, and must be notified before an accumulation area is established or removed. ESD does not maintain any Waste Accumulation Areas (for larger volumes of waste than allowed in an SAA).

ESD SAAs and their Custodians are listed in Appendix 5. The SAA Custodian is responsible for ensuring that all waste added to the SAA or MWAA is accurately labeled, characterized and picked up in a timely fashion (no more than six months following the start of waste accumulation). The Lab-space Lead PI is responsible for knowing about the existence of SAAs in their lab space.

No ESD employee shall establish, or add wastes to, an SAA or MWAA without having taken the appropriate LBNL/EHS training and without the knowledge and approval of the assigned custodian. All employees who generate waste shall separate waste streams to minimize the burden of waste disposal (for example, by keeping chlorinated and nonchlorinated solvents separate, and keeping radioactive and chemically-hazardous wastes separate).

Working with the DSC, the EH&S Division Waste Management Generator Assistant is responsible for scheduling, conducting, and documenting quarterly inspections of all SAAs, and for helping ESD staff to improve waste management, to reduce the amount of hazardous and



mixed waste generated, and to seek on-site treatment strategies. Documentation of the findings of SAA inspections will be distributed to the designated custodians, the Division Director, Department Heads, and the Division Safety Committee members and they will be entered into LCATs. Corrective actions will be implemented according to the hazard level of the finding, but no longer than 60 days, and verified by the DSC at the next quarterly inspection.

## 2.8 Balanced Priorities

*Guiding Principle: ESD management and ESD Principal Investigators will allocate an appropriate amount of resources to EH&S requirements.*

Principal Investigators will factor into their budget plans the costs of safety equipment, employee training, permits, proper chemical storage and inventorying, waste disposal, pollution prevention, environmental protection, ergonomic furniture/accessories, project relocation and de-commissioning, and facility modifications, unless the latter are covered by institutional funding sources.

To facilitate implementation and execution of the ESD EH&S Program, the following Divisional resources are made available:

0.30 x FTE,	Division Safety Coordinator
0.10 x FTE,	Division Administrative Support.

In addition, EH&S Division will provide 0.7 x FTE on a matrix basis to assist the ESD Safety Coordinator and ESD staff. Resources to be committed include approximately 0.2 x FTE for the Division Liaison, and the remainder allocated to Industrial Hygiene and Health Services, Occupational Safety, Fire Protection, Emergency Preparedness, Radiation Protection, Environmental Protection, and Waste Management.

### 3. ACCEPTANCES

#### Signatures

Submitted by:

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Gudmundur Bodvarsson  
ESD Division Director

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Date

EH&S Resource Commitment:

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Phyllis Pei  
EH&S Division Director

---

Date

Accepted:

---

Steven Chu  
Berkeley Laboratory Director

---

Date

#### 4. LIST OF APPENDICES

Appendix 1. ESD Organization Chart

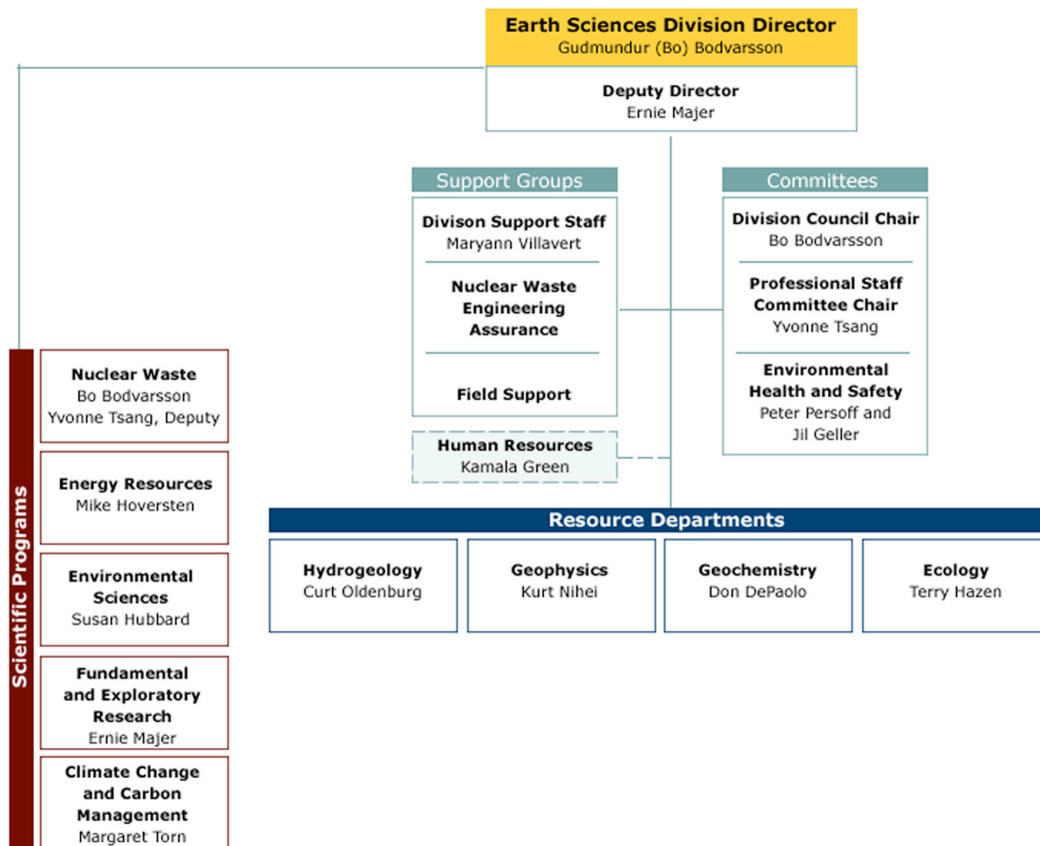
Appendix 2. ESD Safety Checklist

Appendix 3. Project/Facility Safety Review Questionnaire

Appendix 4. ESD Work requiring additional safety documentation and approvals

Appendix 5. Responsible PIs, Lab Contacts and SAA Custodians in ESD Lab Space

## Appendix 1.



Appendix 2.

**Earth Sciences Division Safety Checklist**

Building: \_\_\_\_\_ Inspection conducted by: \_\_\_\_\_  
 Room: \_\_\_\_\_ Date: \_\_\_\_\_  
 Dept. \_\_\_\_\_ Person responsible for corrective action: \_\_\_\_\_  
 Program: \_\_\_\_\_

No.	Inspection Item	Sat	NI	N/A
1	Proper ergonomic workstation configuration to prevent injury (>4hrs/day usage)			
2	Duck and cover space			
3	18 inch clearance below fire sprinkler heads			
4	Doorways, corridors & stairs free of obstruction and stairway doors are kept closed			
5	Exit signs clearly visible & emergency evacuation routes posted			
6	Floor is free of slip, trip & fall hazards			
7	Housekeeping is orderly, does not create any hazards & no combustible loading			
8	Seismic anchoring (e.g., equipment, bookshelves, filing cabinets & refrigerators)			
9	Restraints are used (e.g., lips, bungee cords or chains) on shelves			
10	Proper use of extension cords & power strips (no daisy chains)			
11	Use of Ground Fault Circuit Interruptors near sinks & wet/damp areas			
12	Electrical panels (labeled, accessible & have 36 inch clearances)			
13	28" clearances maintained to egress			
14	Proper use & labeling of refrigerators (Note: flamm storage requires rated units)			
15	Posting of laboratory entrances with hazards & contact information			
16	Food/drink stored and consumed in areas where they will not be contaminated			
17	LBNL Emergency Response Flipchart posted & has contact info listed			
18	Containers labeled with chemical name and hazard(s)			
19	Chemical inventory (Bar Codes on containers)			
20	Proper gas cylinder restraint (2 point securing)			
21	Proper chemical storage (corrosive & flammable cabinets) lack of odors & corrosion			
22	Separation of incompatible hazardous materials (acids/bases, flammables/oxidizers)			
23	Secondary containment used for liquids			
24	Fume hoods: uncluttered, spills cleaned up, slots unobstructed & EH&S certification			
25	SAAs: area posting; container selection, labeling & segregation; and use of drip trays			
26	Personal protective equipment (lab coats, safety glasses & gloves)			
27	Access to emergency eyewashes & safety showers			
28	Presence of HF exposure kits (instructions, Ca-gluconate gel & nitrile gloves)			
29	Presence of spill kits that are appropriate to the chemical hazards			
30	Hot surfaces adequately labeled & controlled			
31	Sharps containers used (biohazard label defaced for non-biohazardous sharps)			
32	Broken glass containers used (cardboard boxes)			
33	Re-evaluate work for new hazards- are there new procedures, personnel or equip?			
34	Lab safety primer			

**Office spaces: use 1-14 Sat = Satisfactory. NI = Needs Improvement. NA = Not Applicable**

Notes, comments & corrective actions

Give cc of completed form, noting corrective actions, to responsible person & Jill Geller (Mail Stop 90-1116). Keep cc in your files

Revised 10/26/04

### Appendix 3. PROJECT/FACILITY SAFETY REVIEW QUESTIONNAIRE

Project Name: \_\_\_\_\_  
Sponsoring \_\_\_\_\_  
Agency: \_\_\_\_\_  
PI or Project Leader: \_\_\_\_\_ Project No. \_\_\_\_\_

- 1 Which best describes this project/facility (number in sequence if more than one applies)?  
☐ computation or theory ☐ hardware design, fabrication, or testing  
☐ experimental work at LBL ☐ off-site work (where?) \_\_\_\_\_ (Safety Plan Required)  
(Computation or theory check ergo in item 6)

2 Staffing (FTE): Div. Staff \_\_\_\_\_ GSRA's \_\_\_\_\_ Other LBL (matrixed) \_\_\_\_\_  
Guests \_\_\_\_\_

3 What building(s) and room(s) does this project/facility occupy? \_\_\_\_\_

- 4 Does this project/facility need/have Activity Hazard Document? ☐ yes ☐ no ☐ don't know  
Radiological Work Authorization? ☐ yes ☐ no ☐ don't know  
Sealed Source Authorizations? ☐ yes ☐ no ☐ don't know  
General License Authorization? ☐ yes ☐ no ☐ don't know  
Laser Authorization? ☐ yes ☐ no ☐ don't know  
Biosafety Authorization? ☐ yes ☐ no ☐ don't know  
X-Ray Authorization? ☐ yes ☐ no ☐ don't know

5 Does this project currently have other Safety Documents, or Environmental Permits?  
☐ yes ☐ no ☐ don't know

6 Which of the following hazards apply to this project? (check all that apply):

- ☐ Compressed gas
- ☐ Chemical hazards (e.g. toxic, carcinogenic, caustic, explosive)
- ☐ Electrical (including stored energy)
- ☐ Fire (flammability) hazards
- ☐ Radiation hazards (sealed sources, isotopes, X-ray sources, work at accelerators)
- ☐ High voltage or High current (add description) \_\_\_\_\_
- ☐ High pressure gas or fluid (? 150 psi gas, ? 1500 psi liquid)
- ☐ Laser (class 3 or 4)
- ☐ High or low temperatures (e.g. heated device or cryogenic fluid)
- ☐ Heavy objects (requiring crane or other moving equipment)
- ☐ High power RF fields (add field strength) \_\_\_\_\_
- ☐ Possible oxygen deficiency or confined space
- ☐ Bio-hazards (BSL 2, 3, or 4)
- ☐ Possible Environmental Impacts
- ☐ **Ergonomics (e.g. VDT's, extensive keyboard use, back injury hazards)**
- ☐ **PLEASE ANSWER #7 as related to this project**
- ☐ Personal Protection Equipment (e.g. ear protectors, respirators, gloves)
- ☐ Work from heights

7 Give a short listing of safety measures taken to reduce the risks associated with the hazards indicated in #6 above (e.g. interlocks, gas detectors, safety reviews, training, etc.).  
\_\_\_\_\_  
\_\_\_\_\_

8 Name of designated safety contact person for the project/facility? \_\_\_\_\_

9 Will this project generate hazardous waste? ☐ yes ☐ no

10 If hazardous waste will be generated, provide the following information:

Type of waste: \_\_\_\_\_ Annual Amount: \_\_\_\_\_  
Location of SAA (Building & Room): \_\_\_\_\_

Signature of Project Leader: \_\_\_\_\_ Date: \_\_\_\_\_

Division Safety Coordinator: \_\_\_\_\_ Date: \_\_\_\_\_

Referred/Reviewed by EH&S Professionals \_\_\_\_\_ Date: \_\_\_\_\_  
(as applicable)

**ESD WORK REQUIRING ADDITIONAL SAFETY DOCUMENTATION AND APPROVALS**  
**(updated 2/14/05)**

In accordance with PUB-3000, the following safety authorizations have been approved by the EH&S Division for ESD:

**Activity Hazards Documents (AHD)**

1. #2046 (last review 4/15/04). Barry Freifeld, Bldg 64 High Bay, Gas Hydrates Experiment, with accompanying Engineering Note 3/14/04
2. #2065 (last review 4/2/04). Terry Hazen, 70A-4463- Lasers in Microscope (laser moved from 70-131, formerly AHD #BE1019- Jiamin Wan)
3. In Preparation, Mark Conrad, 70A-4431, "CO2 Laser System for Oxygen and Silicon Isotope Analyses"

**Radiological Work Authorizations (RWA)**

1. #1107 (good through 2/06), Tetsu Tokunaga, Bldg. 70-114, 70A-1105, 70A-4459, Class II; Desorption of U on soil, limits on Tc-99, U-238.
2. #1016 (good through 6/05). Hoi-Ying Holman, 70A-3317 and 70-166, Class I; Uptake of organic compounds labeled with C-14 and (ALS) Beamline, limits on C-14, U-238.
3. #1125 (good through 3/05), John Christensen, 70A-4429, Class I; Use of U Spectroscopic Solution, limits for Pb-205, Th-229, Th-232, U-233, U-238.
4. #1152 (good through 5/06), Burton Kennedy, 70A-4419 (fume hood) and 75D-101B, Class I; Analysis of the 81Kr and 85K4 Swiss Spike by Mass Spectrometry; limits on Kr-81 and Kr-85.
5. #1154 (good through 5/06), Sharon E. Borglin, 70A-4459, Class I; Processing of Soil Cores, limits for Tc-99, Th-228, Th-230, U(natural), U-234, U-235, U-238.

**Sealed Source Authorizations (SSA)**

1. #140 (good through 6/05), Susan Hubbard, 70A-4463, Class II; Sources housed in Hydroprobe instrument

**Generally Licensed Authorizations (GLA)**

1. #414, (signed 10/02), Todd Wood, 70A-4404A; Three licensed static eliminators used in cleanroom
2. #406, (tested 12/4/03), Will Stringellow, 70A-3317; Two GCs
3. #412, (signed 12/01), Barry Freifeld, 64 High Bay; Two licensed sources in X-Ray Scanner Core Analyzer
4. #417 (signed 1/04) Jeffrey Bird (transferring to Deb Williard), 70-143; Three static eliminators integral to lab equipment

### Low Activity Source Authorizations (LAS)

1. #L012 (good through 3/2005), Todd Wood, 70A-4405; Authorization for TH-nat and U-nat from Coupled Plasma-Mass SpecS140
2. #L014 (good through 3/2005), Terry Hazen, 70A-4463B; Authorization for radionuclides from soil and groundwater samples
3. #L007 (good through 3/2005), Mark Conrad, 70A-4413, 4419, 4425, 4429, 4431; Authorization for radionuclides from soil and water samples from Hanford

### BioSafety Level "2" Registration Forms (BSL-2 Agents requiring annual renewal)

<u>Final #</u>	<u>Name</u>	<u>Lab #</u>	<u>Approval Date</u>	<u>BSL-2 Agents</u>	<u>Project Name</u>
B107-100803	Gary Anderson	70A-3317, 4475	7/21/03	Salmonella typhi, S. Typimurium, S. enteritidis	Microbial community dynamics, molecular tracking and ecology of human pathogens in the environment
<b>Made inactive during PY04:</b>					
B061-121201	Hoi-Ying Holman/Tamara Torok	70A-1121,4475,2275	12/12/01	<i>Bacillus anthracis</i> , m. macrophage c.l.	Exposure of Macrophage to <i>Bacillus anthracis</i>

### Biological Use Registration (BSL-1 agents)

	<u>Final #</u>	<u>Name</u>	<u>Lab #</u>	<u>Date</u>	<u>Project Name</u>	<u>Notes</u>
1.	B053-0120704	Hoi-Ying Holman	70A-2275,1121	July 1, 2004	Synchrotron Infrared Spectromicroscopy	(supercedes B053-011402)

### X-Ray Authorization

Liviu Tomutsa, CT Scanner, 51F-002. (renewal date 7/7/06)

### Benchtop Acid Neutralization Procedures

Joern Larsen (author), 70-114, revised 6/1/04, acidic radioactive/mixed waste

Joern Larsen (author), 70-114, revised 6/2/04, radioactive/mixed waste from Uranium analysis with a KPA

Tryg Lundquist (author), 70-158, January 2005, acid waste from ICP.



## Off-Site Safety and Environmental Protection Plans (OSSEPP)

In accordance with ESD policy and procedures, the following tables lists the OSSEPPs that have been prepared and approved and are still active as of 11/16/04:

LBNL ESD OSSEPP YR	LBNL ESD OSSEPP	Project Title:	Principal Investigator:	Site:
04	01	GEOSEQ	Larry Myer/Sally Benson	South Liberty Oil Field, TX
04	02	Fort Ord Groundwater Remediation: Enhanced Water Quality Monitoring	Curt Oldenburg	Fort Ord Marina, CA OUI
04	03	Drilling for Methane Hydrates	Barry Freifeld	Currently Gulf of Mexico
04	04	Ocean Biogeochemical Processes Group: Work at sea	Jim Bishop	Territorial and Inter- national Ocean Wa- ters
04	05	Collaboration with NASA's Bio-Mars project	Mack Kennedy	Tributaries to the Snake River on the Snake River Plain, Idaho
04	06	GeoSeq: Frio Borehole Seismic	Larry Myer, Sally Benson	Well site near Dayton Texas
04	07	Watershed Contributions of Metals to Cook Inlet	Christopher Gray	Cook Inlet, AK
04	08	Active Source Monitoring	Ernie Majer / Tom Daley	Parkfield SAFOD Well
04	09	Microhole	Ernie Majer	DOE/Rocky Moun- tain Oil Test Center
04	10	Peña Blanca Science Plan: Building Confidence in Yucca Mountain Per- formance through the Peña Blanca Natu- ral Analogue	A. Simmons (LANL), P. Dobson (LBNL)	Peña Blanca field area, Chihuahua, Mexico
03	02	Characterization of Methane Hydrate Bearing Core	Barry Freifel	Anadarko North Slope Drill Site
03	03	High Frequency Impedance Measure- ment	Ki Ha Lee	Richmond Marina Bay
03	04	Real-time flow and temperature moni- toring	Nigel W.T. Quinn	Several : Middle San Joaquin River; San Luis NWR; Grass- land WD
03	05	Fieldwork for sampling geothermal	B. Mack Kennedy	Diverse areas and

			Wells and hot and cold springs			locations
02	01		Seismic Stimulation	E. L. Majer		Lost Hills, CA
02	01		Seismic Stimulation	Tom Daley		Elk Hills, CA
01	03		Carbon and Water Cycling at the ARM Southern Great Plains Site	Margaret S. Torn		
02	03		High Frequency Impedance	Ki Ha Lee		Richmond Field Station
02	04		Re-evaluating the Geothermal Energy Potential of Nevada	B. M. Kennedy		Reno, and Silver Springs, Lyon County, Nevada
02	05		Estimation of Water Content Using Surface CPR: Development of a Precision Agricultural Tool	Susan Hubbard		Dehlinger Winery
02	06		Moisture Monitoring and Drift Seepage Testing, Yucca Mtn.	Joseph S. Wang		Nevada Test Site
02	07		Ocean Development of LBNL Linear X-ray Scanner	Barry M. Freifeld		Cascadia Ridge, off Oregon Coast
02	08		Fluids associated with San Andreas Fault	B. Mack Kennedy		Parkfield, CA
00	02		High Frequency Impedance	Ki Ha Lee		Point Reyes National Seashore
00	03		Isotopic and Geothermal Sampling of Fluids at Salton Sea	Mack Kennedy		Salton Sea Geothermal Field
00	05		Thermal & Hydrological Testing in the ESF, Yucca Mtn. NV	Yvonne Tsang and Joe Wang		Nevada Test Site

Appendix 5.

Building	Room	Space/Activity Description	Lab-space Lead PI	Lab Contact	SAA waste description	SAA Responsible Party
<b>Geochemistry, Don Depaolo, Dept. Head</b>						
51	8 conex	GeoChem Storage	Perry,Dale L	Alex Morales		
70	120	Geochemistry	Waychunas, Glenn A	Waychunas, Glen	Se, As, Cu solids	G. Waychunas
70	143	Geochemistry	Torn,Margaret S	Williard,Deb E		
70	279	Geochemistry	Torn,Margaret S	Williard,Deb E		
070A	4403	Geochemistry	Torn,Margaret S	Williard,Deb E	1. Solvents, corrosives. 2. Haz waste	D. Williard
070A	4405	Geochemistry	Bishop,James K	Wood,Todd J	1. Hood HCl., HNO3, 2. ICP waste HCl	Wood,Todd J
070A	4405A	Geochemistry	Bishop,James K	Wood,Todd J		
070A	4413	Geochemistry (CIG)	Kennedy,Burton M	Woods,Katharine N		
070A	4413A	Geochemistry (CIG)	Conrad,Mark S	Woods,Katharine N		
070A	4419	Geochemistry	Kennedy,Burton M	van Soest,Matthijs C	org solvents, acids	Woods,Katharine N
070A	4421	Geochemistry	Kennedy,Burton M	van Soest,Matthijs C		
070A	4425	Geochemistry	Conrad,Mark S	Woods,Katharine N		
070A	4429	Geochemistry	Christensen,John N	Christensen,John	acids	Christensen,John
070A	4431	Geochemistry (CIG)	Conrad,Mark S	Woods,Katharine N	1-corrosives; 2-solvents	Woods,Katharine N
070A	4458	Geochemistry	Torn,Margaret S	Cooley,Heather S		
<b>Ecology, Terry Hazen, Dept. Head</b>						
14	137	soil sample processing	Quinn,Nigel Wt	Kate Huckelbridge		
70	158	Geochemistry	Quinn,Nigel Wt	Lundquist,Tryg	liquids & solids /w trace metals fr ICP	T. Lundquist
70	158	Geochemistry	Quinn,Nigel Wt	Lundquist,Tryg	acids & metals	Li Yang
70	166	Geochemistry	Stringfellow,William T	Alusi,Thana		
070A	2235	Hydrology&Wetlands Studies	Stringfellow,William T	Hanlon,Jeremy	corrosives & organics	J. Hanlon
070A	2253	Microbial Background Studies	Andersen, Gary	Piceno, Yvette	phenols, chloroform (hood)	Piceno, Yvette
070A	2275	Microbial Ecology & Env Eng	Holman,Hoi-Ying	Holman,Hoi-Ying	solvents	K. Brooks, E. Wozel, H-Y. Holman
070A	2275B	Microbial Ecology & Env Eng	Holman,Hoi-Ying	Holman,Hoi-Ying		
070A	2275C	Microbial Ecology & Env Eng	Holman,Hoi-Ying	Holman,Hoi-Ying	1. biohazard (BSL-1), 2. rads	H-Y Holman
070A	4459	Microbial Ecology Env (CEB)	Hazen,Terry C	Joyner,Dominique C		
070A	4461	Microbial Ecology & Env (CEB)	Hazen,Terry C	Joyner,Dominique C	(Life Sciences)	T. Torok
070A	4462	Microbial Ecology & Env (CEB)	Hazen,Terry C	Hazen,Terry C		
070A	4463	Microbial Ecology & Env (CEB)	Hazen,Terry C	Borglin,Sharon E	acids & organics	Borglin,Sharon E
070A	4463A	Microbial Ecology	Hazen,Terry C	Borglin,Sharon E		
070A	4463B	Microbial Ecology	Hazen,Terry C	Borglin,Sharon E	rad waste	?
070A	4463C	Microbial Ecology	Hazen,Terry C	Borglin,Sharon E		
<b>Geophysics, Kurt Nihei, Dept. Head</b>						
51F	102	G&G CAT Scan Lab	Tomutsa,Liviu	Tomutsa,Liviu		
51F	103	CAT Scan Cntrl Room	Tomutsa,Liviu	Tomutsa,Liviu		
<b>Hydrogeology, Curt Oldenburg, Dept. Head</b>						
14	118	Yucca Mtn Proj	Salve,Rohit	Salve,Rohit		
14	134A	rock-crushing	Salve,Rohit	Salve,Rohit		
51	7	ESD Rock Lab	Kneafsey,Timothy J	Kneafsey,Timothy J	Organics & acids	Kneafsey,Timothy J
51	8 east	Methane Hydrate	Kneafsey,Timothy J	Kneafsey,Timothy J		
70	114	Soil & Rock Wet Lab	T. Tokunaga	Larsen,Joern T	acids & organics	Larsen,Joern T
70	114	Soil & Rock Wet Lab	T. Tokunaga	Larsen,Joern T	rad waste	Larsen,Joern T
70	0114A	Soil & Rock Office	T. Tokunaga	Larsen,Joern T	rad/mixed waste	j. Larsen
70	116	HRD Soil Lab	T. Tokunaga	T. Tokunaga, J. Larsen	Se & Cr in soils	J. Larsen
70	127	HRD	Wan,Jiamin	Tokunaga,Tetsu K		
70	131A	HRD	J. Wan	Larsen,Joern T	acids, organics	J. Larsen
70	131	HRD	J. Wan	Larsen,Joern T		
70	cabinets	HRD/YMP	T. Kneafsey	T. Kneafsey		
<b>Field and Technical Support, Ernie Majer, Lead</b>						
64	160	Fabrication and Soldering Lab	Ernie Majer	Alex Morales		
64	161	ESD SHOP	Ernie Majer	P. Rizzo		
64	163	Field Equipment Staging	Ernie Majer	Alex Morales	acids & organics	Alex Morales

(updated 1/20/05)